

# Lesson 6-2 (pp. 291–297)

## Slope-Intercept Form

### Lesson Objectives

- 1 Write equations in slope-intercept form
- 2 Graph linear equations

### NAEP 2005 Strand:

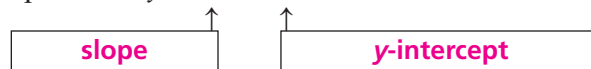
**Topics:** Patterns, Relations, and Functions; Equations and Inequalities

**Local Standards:** \_\_\_\_\_

## Vocabulary and Key Concepts

### Slope-Intercept Form of a Linear Equation

The slope-intercept form of a linear equation is  $y = mx + b$ .



A linear equation is an equation whose graph forms a straight line.

The y-intercept is the y-coordinate of the point where a line crosses the y-axis.

### Example

- 1 Identifying Slope and y-Intercept** What are the slope and y-intercept of  $y = 2x - 3$ ?

$y = mx + b$  Use slope-intercept form.

$$y = \boxed{2}x + \boxed{-3}$$

The slope is  $\boxed{2}$ ; the y-intercept is  $\boxed{-3}$ .

### Check Understanding

- 1.** Find the slope and y-intercept of each equation.

**a.**  $y = -2x + 1$

$$m = -2; b = 1$$

**b.**  $y = \frac{7}{6}x - \frac{3}{4}$

$$m = \frac{7}{6}; b = -\frac{3}{4}$$

**c.**  $y = -\frac{4}{5}x$

$$m = -\frac{4}{5}; b = 0$$

## Examples

### ② Writing an Equation From a Graph Write the equation for the line.

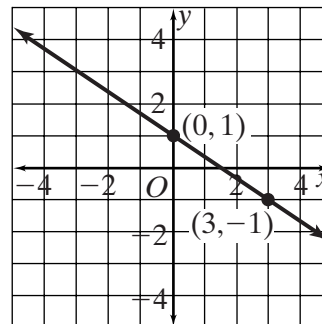
**Step 1** Find the slope. Two points on the line are  $(0, 1)$  and  $(3, -1)$ .

$$\begin{aligned} \text{slope} &= \frac{-1 - 1}{3 - 0} \\ &= -\frac{2}{3} \end{aligned}$$

**Step 2** Write an equation in slope-intercept form. The y-intercept is  $1$ .

$$y = mx + b$$

$$y = -\frac{2}{3}x + 1 \quad \text{Substitute } -\frac{2}{3} \text{ for } m \text{ and } 1 \text{ for } b.$$

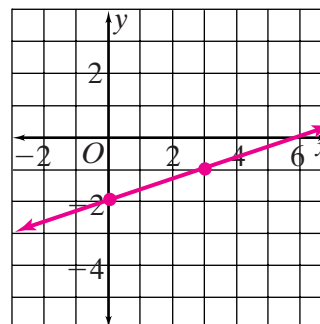


### ③ Graphing Equations Graph $y = \frac{1}{3}x - 2$ .

**Step 1** The y-intercept is  $-2$ . So plot a point at  $(0, -2)$ .

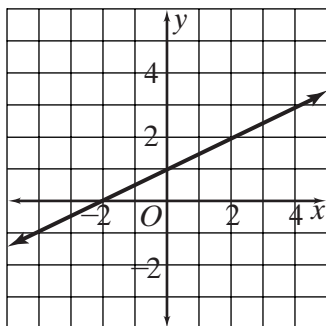
**Step 2** The slope is  $\frac{1}{3}$ . Use the slope to plot a second point.

**Step 3** Draw a line through the two points.



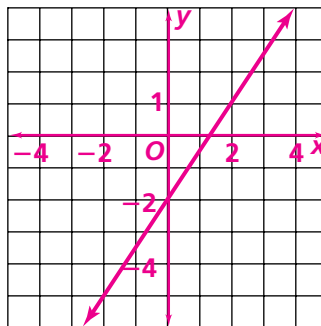
## Check Understanding

2. Write the equation of the line.



$$y = \frac{1}{2}x + 1$$

3. Graph  $y = \frac{3}{2}x - 2$ .



### Example

- 4 Applying Slope-Intercept Form** The base pay for a used-car salesperson is \$300 per week. The salesperson also earns 15% commission on sales made. The equation  $t = 300 + 0.15s$  relates total earnings  $t$  to sales  $s$ . Graph the equation.

**Step 1** Identify the slope and y-intercept.

$$t = 300 + 0.15s$$

$$t = \boxed{0.15s} + \boxed{300}$$

↑ ↑  
 slope                      y-intercept

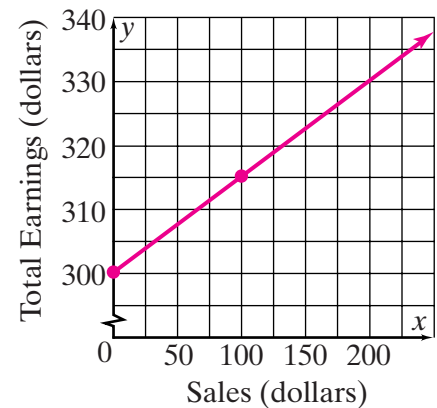
Rewrite the equation in slope-intercept form.

**Step 2** Plot two points. First plot a point at the y-intercept. Then use the slope to plot a second point.

The slope is  $\boxed{0.15}$ , which equals  $\frac{\boxed{15}}{100}$ . Plot a second point  $\boxed{15}$  units above and  $\boxed{100}$  units to the right of the y-intercept.

**Step 3** Draw a line through the points.

**Weekly Earnings for a Used-Car Salesperson**



### Check Understanding

4. Suppose the base pay of a delivery person is \$150, and his commission on each sale is 30%. The equation relating his total earnings  $t$  to sales  $s$  is  $t = 150 + 0.3s$ . Graph the equation.

